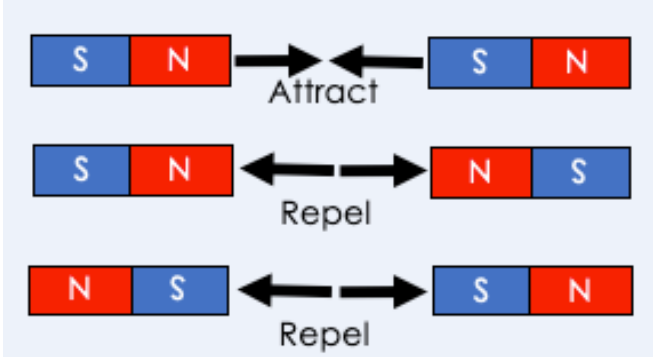
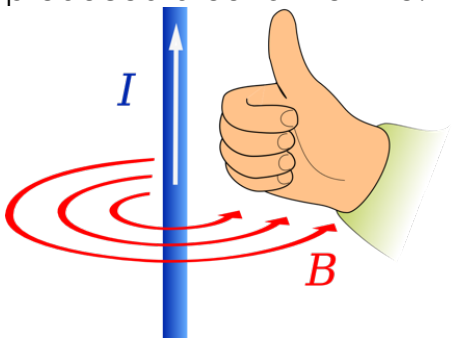
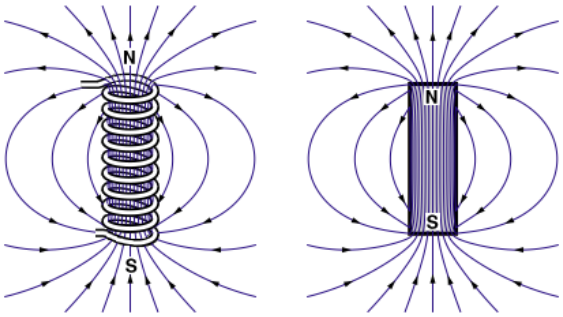
1. The magnetic force is a **non-contact** force.
2. Only some metals are magnetic: **iron, cobalt, nickel** and their alloys (such as **steel**).
3. Magnets have a **north** and a **south** pole.
4. The poles of a magnet are where the magnetic force is the strongest.
5. **Opposite poles attract** and **like poles repel** (remember, opposites attract!)



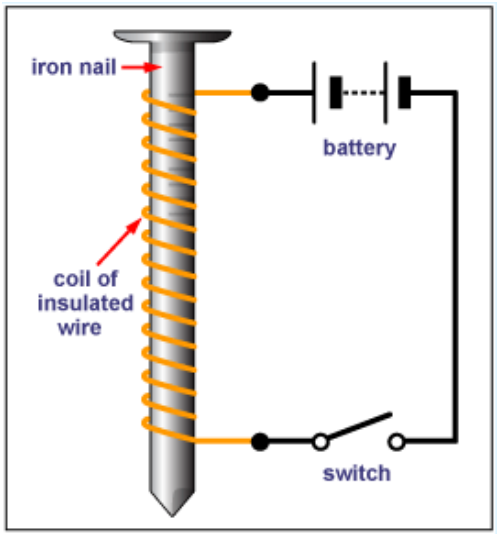
6. **Permanent magnets** are magnetic all the time. Bar magnets are permanent magnets.
7. Magnetic materials, including the Earth, create magnetic fields.
8. Magnetic field lines are used to describe the **strength** and **direction** of the magnetic field.
9. The direction of the magnetic field at any point is given by the direction of the force that would act on another north pole placed at that point
10. The arrows on the magnetic field lines always point from the North pole to the South pole.
11. Magnetic field lines never cross or touch.
12. Field lines flow from the North pole to the South pole.
13. Closer field lines demonstrate that the magnetic force is stronger.
14. **Induced magnets** are materials that become magnetic when placed in a magnetic field and when removed, lose their magnetism.
15. When a current flows through a conducting wire a magnetic field is produced around the wire.



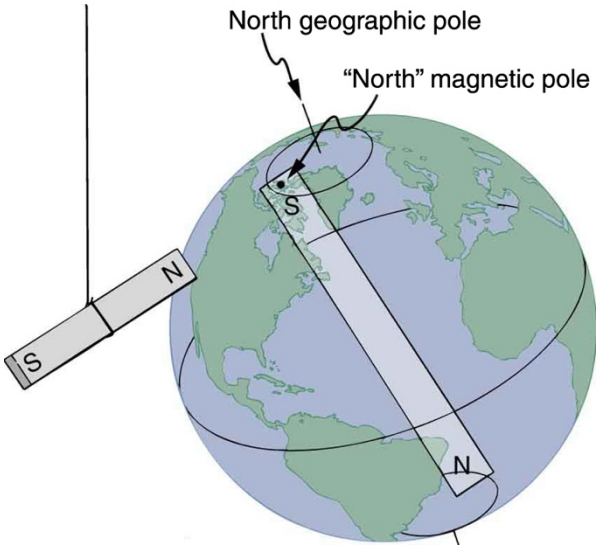
16. The strength of the magnetic field depends on the current through the wire and the distance from the wire.
17. When a wire is wrapped around into a coil shape, we call it a solenoid.
18. Shaping a wire to form a solenoid increases the strength of the magnetic field created by a current through the wire. The magnetic field inside a solenoid is strong.
19. The magnetic field around a solenoid has the same pattern as the magnetic field around a permanent bar magnet.



20. An **electromagnet** is a solenoid with an iron core. We can make an electromagnet by wrapping a wire around an iron nail and turning on the current.



21. The strength of the magnetic field around a solenoid is increased by **adding more turns in the coil, adding a magnetic material as a core or increasing current.**
22. The Earth has a magnetic field.



23. A compass will point to Earth's North "magnetic" pole which is different to Earth's geographic North pole which is also different to the true North pole of the Earth's magnetic field.
24. The Earth behaves like it has a giant bar magnet inside it, because of currents of molten iron and nickel in its core.
25. Molten means melted.
26. The Earth's magnetic field has the same pattern as a permanent bar magnet.

